

## PATENT ABSTRACTS OF JAPAN

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### (54) DEVICE AND METHOD FOR RECORDING/REPRODUCTION

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a DVD+RW recorder wherein a redundant operation time is reduced.

SOLUTION: A DVD recorder 10 is provided with a system controller 26 for controlling recording/reproduction of a DVD+RW disk. A system controller 26 inhibits the reproduction of menu data recorded in the DVD+RW after recorded contents are edited or new contents are recorded. The reproduction of the menu data is inhibited until at least new menu data are recorded. Furtherin the DVD

recorder 10during disk ejectionmenu data reflecting title contents currently recorded in a recording medium are generatedand the generated menu data and management data are recorded in a disk.

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## CLAIMS

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[Claim(s)]

[Claim 1]

Contents data and management data which manages the contents data concernedAttachment and removal of a recording medium with which a format which specified recording menu data for operating a menu screen which is a user interface picture for reproduction of contents data was adopted are enabledIn a recording and reproducing device which performs record and reproduction of data where the recording medium concerned is attached

While coding inputted contents data to a data stream corresponding to the above-mentioned format and recording a coded data stream on the above-mentioned recording mediumA record reproduction means which reproduces a data stream corresponding to the above-mentioned format from the above-mentioned recording mediumdecodes a reproduced data streamgenerates contents dataand outputs generated contents data

While controlling the above-mentioned record reproduction meansit has a control means which carries out record reproduction of the above-mentioned management data and menu data to the above-mentioned recording medium  
The above-mentioned control means

Reproduction of menu data currently recorded on the above-mentioned recording medium is forbidden until there is record of new menu dataafter performing record of edit or the new contents data to recorded contents data

A recording and reproducing device generating menu data reflecting the contents of contents data currently recorded on the present recording mediumand recording menu data and management data which were generated on the above-

mentioned recording medium when there are directions from the time of an operation stop or a user at the time of discharge of the above-mentioned recording medium.

[Claim 2]

The above-mentioned control means

The recording and reproducing device according to claim 1 reproducing contents data currently recorded on the above-mentioned recording medium based on information which generated the 2nd different menu screen from a menu screen based on menu data recorded on the above-mentioned recording medium and was inputted according to the 2nd menu screen concerned.

[Claim 3]

Contents data and management data which manages the contents data concerned In recording and reproducing systems which perform record and reproduction of data to a removable recording medium with which a format which specified recording menu data for operating a menu screen which is a user interface picture for reproduction of contents data was adopted

Reproduction of menu data currently recorded on the above-mentioned recording medium is forbidden until there is record of new menu data after performing record of edit or the new contents data to recorded contents data

Recording and reproducing systems generating menu data reflecting the contents of contents data currently recorded on the present recording medium and recording menu data and management data which were generated on the above-mentioned recording medium when there are directions from the time of an operation stop or a user at the time of discharge of the above-mentioned recording medium.

[Claim 4]

The recording and reproducing systems according to claim 3 reproducing contents data currently recorded on the above-mentioned recording medium based on information which generated the 2nd different menu screen from a menu screen based on menu data recorded on the above-mentioned recording

medium and was inputted according to the 2nd menu screen concerned.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

### [Field of the Invention]

This invention relates to the recording and reproducing device and method of recording data for example to recording media such as DVD.

[0002]

### [Description of the Prior Art]

As a device which records the recording and the taken image of television broadcasting the DVD recorder using the recordable DVD as media is beginning to spread instead of a videotape recorder. A recordable DVD is an optical disc in which record with a capacity of 4.7 G bytes is possible on one side (12 cm in diameter and 1.2 mm in thickness).

[0003]

The added type (only 1 time recordable type) of a postscript and an erasable type (rewritable type of multiple times) are doubled with a recordable DVD and the format of five kinds DVD-R DVD-RW DVD+R and DVD-RAM is proposed. These formats are proposed from the "DVD+RW alliance" (see the nonpatent literature 2.) "DVD Forum" (see the nonpatent literature 1.) which is a commercial standard organization of DVD and whose DVD Forum are different commercial standard organizations.

[0004]

DVD-R and DVD+R are the added-a postscript type optical discs which can be written in only once. DVD-R is an optical disc according to the format proposed by DVD Forum.

DVD+R is an optical disc according to the format proposed by the DVD+RW

alliance.

[0005]

DVD-RW and DVD+RW are the optical discs which can rewrite the multiple times by which the compatibility of the format with DVD (DVD-VIDEO) only for playback specified by "DVD Forum" was taken. DVD-RW and DVD+RW are renewable also with the conventional DVD player only for reproduction. DVD-RW is an optical disc according to the format proposed by DVD Forum. DVD+RW is an optical disc according to the format proposed by the DVD+RW alliance.

[0006]

DVD-RAM is an optical disc which can rewrite the form stored by the cartridge. The compatibility with DVD-VIDEO is low and other DVDs are the optical discs in a substantially different format. DVD-RAM is the optical disc proposed by DVD Forum.

[0007]

The unit called a "title" as a data unit is prescribed by the DVD-VIDEO standard proposed by DVD Forum. The "title" specified by this standard is a concept which shows the reproduction unit of one contents such as one work of a movie and one work of a music album for example. In the DVD-VIDEO standard it is supposed that it is recordable to 99 titles to one DVD disk.

[0008]

[Nonpatent literature 1]

Internet <URL : <http://www.dvdforum.gr.jp/>>

[Nonpatent literature 2]

Internet <URL : <http://www.dvdrw.com/>>

[0009]

[Problem(s) to be Solved by the Invention]

By the way in DVD+RW the format which maintained a DVD-VIDEO standard and

compatibility is adopted. However in DVD+RW in order to consider it as a DVD-VIDEO standard and the data configuration which maintained compatibility processing called a FAINA rise is performed. A FAINA rise is processing which records required management data and file systems other than contents data on a disk so that it may become renewable with the DVD player only for playback.

[0010]

By DVD+RW after record and the update process of record of a title deletion of a title change of a title name etc. occur certainly performing FAINA rise processing is specified.

[0011]

In the FAINA rise processing in this DVD+RW not only management data but renewal of the title menu described by VMG specified by the DVD-VIDEO standard is performed.

[0012]

However the work which generates the video data of a title menu and records this video data further is dramatically serious and many processing time will be spent. While performing the processing even if a user pushes a recording button for example it becomes impossible to record by reacting immediately. Therefore for example immediately after the recording of the front title was completed recording of the following title could not be started but the situation where recording of the head part of the 2nd title could not be performed had occurred to carry out real-time recording of the two titles continuously.

[0013]

This invention is proposed in view of such the actual condition and is a thing. the purpose -- \*\* -- when recording data to the recording medium with which the format which specified recording menu data [ like ] was adopted it is providing the recording and reproducing device and method which reduced redundant operating time.

[0014]

[Means for Solving the Problem]

Management data in which a recording and reproducing device concerning this invention manages contents data and the contents data concerned Attachment and removal of a recording medium with which a format which specified recording menu data for operating a menu screen which is a user interface picture for reproduction of contents data was adopted are enabled It is a recording and reproducing device which performs record and reproduction of data where the recording medium concerned is attached While coding inputted contents data to a data stream corresponding to the above-mentioned format and recording a coded data stream on the above-mentioned recording medium A record reproduction means which reproduces a data stream corresponding to the above-mentioned format from the above-mentioned recording medium decodes a reproduced data stream generates contents data and outputs generated contents data While controlling the above-mentioned record reproduction means have a control means which carries out record reproduction of the above-mentioned management data and menu data to the above-mentioned recording medium and the above-mentioned control means Until there is record of new menu data after performing record of edit or the new contents data to recorded contents data Forbid reproduction of menu data currently recorded on the above-mentioned recording medium and At the time of discharge of the above-mentioned recording medium. When there are directions from the time of an operation stop or a user menu data reflecting the contents of contents data currently recorded on the present recording medium is generated and menu data and management data which were generated are recorded on the above-mentioned recording medium.

[0015]

Management data in which recording and reproducing systems concerning this invention manage contents data and the contents data concerned As opposed to a removable recording medium with which a format which specified recording

menu data for operating a menu screen which is a user interface picture for reproduction of contents data was adopted. Until there is record of new menu data after being recording and reproducing systems which perform record and reproduction of data and performing record of edit or the new contents data to recorded contents data, forbid reproduction of menu data currently recorded on the above-mentioned recording medium. At the time of discharge of the above-mentioned recording medium. When there are directions from the time of an operation stop or a user menu data reflecting the contents of contents data currently recorded on the present recording medium is generated and menu data and management data which were generated are recorded on the above-mentioned recording medium.

[0016]

In a recording and reproducing device and a method concerning the above this invention after performing record of edit or the new contents data to recorded contents data, reproduction of menu data currently recorded on the above-mentioned recording medium is forbidden. Prohibition of reproduction of this menu data is performed until there is record of menu data new at least. In a recording and reproducing device and a method concerning this invention. When there are directions from the time of an operation stop or a user at the time of discharge of the above-mentioned recording medium menu data reflecting the contents of contents data currently recorded on the present recording medium is generated and menu data and management data which were generated are recorded on the above-mentioned recording medium. That is in a recording and reproducing device and a method concerning this invention record of menu data and management data is not performed like each time at the time of record of contents data or updating but it collects later and renewal of menu data and management data is performed.

[0017]

[Embodiment of the Invention]

Hereafter the DVD recorder which applied this invention as an embodiment of the

invention is explained.

[0018]

The block lineblock diagram of DVD recorder 10 of an embodiment of the invention is shown in drawing 1.

[0019]

DVD recorder 10 of an embodiment of the invention is a device which records the AV signal (an image/audio signal) played from television broadcasting or a recording tape on a DVD disk and plays and outputs an AV signal from a DVD disk.

[0020]

In DVD recorder 10. By the "DVD+RW alliance" which is the commercial standard organization of DVD-VIDEO DVD-R DVD-RW and DVD proposed by "DVD Forum" which is a commercial standard organization of DVD. It is a disk recorder of a multi type the record and renewable. [ to DVD+R and DVD+RW which are proposed ] Hereafter in naming generically these DVD disks in which record reproduction is possible with DVD recorder 10 it shall call it DVD disk 1.

[0021]

The internal configuration of DVD recorder 10 is explained with reference to drawing 1.

[0022]

DVD recorder 10 is provided with the following.

Video input terminal (Vin).

Audio input terminal (Ain).

Video output terminal (Vout).

An audio output terminal (Aout) a digital interface terminal (DVin) video A/D converter 11 video D/A converter 12 audio A/D converter 13 and audio D/A converter 14.

[0023]

A video input terminal (Vin) is connected with a tuner set top box video signal

playback equipment etc. via an image cable. The video signal which is a video signal of predetermined video image format such as NTSC and PAL for example is inputted into a video input terminal (Vin) from these devices. The video signal inputted into the video input terminal (Vin) is changed into a digital signal from an analog signal by video A/D converter 11 and is inputted in a device. A video output terminal (Vout) is connected with a television monitor or a video-signal-recording device etc. via an image cable. A video output terminal (Vout) outputs the video signal which is a video signal of predetermined video image format such as NTSC and PAL as opposed to these devices. The video signal outputted from a video output terminal (Vout) is changed into an analog signal from a digital signal by video D/A converter 12 and is outputted out of a device.

[0024]

An audio input terminal (Ain) is connected with a tuner set top box, audio signal playback equipment etc. via an audio cable. The audio signal which is a voice music signal of a predetermined format for example is inputted into an audio input terminal (Ain) from these devices. The audio signal inputted into the audio input terminal (Ain) is changed into a digital signal from an analog signal by audio A/D converter 13 and is inputted in a device. An audio output terminal (Aout) is connected with audio equipment or an audio signal recording device etc. via an audio cable. An audio output terminal (Aout) outputs the audio signal which is a voice music signal of a predetermined format as opposed to these devices. The audio signal outputted from an audio output terminal (Vout) is changed into an analog signal from a digital signal by audio D/A converter 14 and is outputted out of a device.

[0025]

A digital interface terminal (DVin) is connected with DV player which plays AV information (a video data and audio information) from DV tape cassette for example via the interface cable for digital data transmissions such as an IEEE1394 terminal and USB. The AV information (DV data) of the DV format which this DV player played from DV tape cassette is inputted into a digital interface terminal

(DVin).

[0026]

DVD recorder 10 is provided with the following.

NTSC/PAL decoder 15.

DV decoder 16.

MPEG encoder 17.

MPEG decoder 18 the graphic synthetic circuit 19 and the NTSC/PAL encoder 20.

[0027]

The NTSC/PAL decoder 15 is inputted from a video input terminal (Vin) and changes into the video signal of ITU-R BT.601 format video signals digitized by video A/D converter 11 such as NTSC or a PAL format.

[0028]

The DV decoder 16 changes into the video signal of ITU-R BT.601 format and the audio signal of a predetermined format DV data inputted from the digital interface terminal (DVin).

[0029]

MPEG encoder 17 The video signal of ITU-R BT.601 format and the audio signal of the predetermined format digitized by audio A/D converter 13 is inputted compression encoding of these is carried out by MPEG-2 method and the AV information stream (MPEG-2 stream) of MPEG-2 method is generated.

[0030]

MPEG-2 stream is inputted and MPEG decoder 18 carries out extension decoding of this and generates the video signal of ITU-R BT.601 format and the audio signal of a predetermined format.

[0031]

The graphic synthetic circuit 19 performs processing which compounds the onscreen display picture (OSD picture) by which the external input was carried out on the display screen of the video signal of ITU-R BT.601 format.

[0032]

The NTSC/PAL encoder 20 changes into the video signal of NTSC or a PAL format the video signal of the ITU-R BT.601 format outputted from the graphic synthetic circuit 19 and outputs it from a video output terminal (Vout).

[0033]

DVD recorder 10 is provided with the switching circuit 21 which switches the transmission route of a video signal and an audio signal.

[0034]

The switching circuit 21 switches a transmission route in the time of record and reproduction and switches a transmission route in DV data and the time of the input of the other signal further at the time of record.

[0035]

Specifically the switching circuit 21 switches a course as follows. Namely in recording signals other than DV data. The switching circuit 21 supplies the video signal outputted from the NTSC/PAL decoder 15 to MPEG encoder 17 and the graphic synthetic circuit 19. A transmission route is switched so that the audio signal outputted from audio A/D converter 13 may be supplied to MPEG encoder 17 and audio D/A converter 14. In recording DV data the switching circuit 21. A transmission route is switched so that the video signal outputted from the DV decoder 16 may be supplied to MPEG encoder 17 and the graphic synthetic circuit 19 and the audio signal outputted from the DV decoder 16 may be supplied to MPEG encoder 17 and audio D/A converter 14. In reproducing the switching circuit 21 switches a transmission route so that the video signal outputted from MPEG decoder 18 may be supplied to the graphic synthetic circuit 19 and the audio signal outputted from MPEG decoder 18 may be supplied to audio D/A converter 14.

[0036]

DVD recorder 10 is provided with the following.

Buffer circuit 22.

Drive device 23.

[0037]

The buffer circuit 22 is a memory which stores temporarily MPEG-2 stream and control data stream which are recorded and played to DVD disk 1.

The drive device 23 is a device which is equipped with DVD disk 1 it accesses physically to DVD disk 1 with which it is equipped and performs record and playback of data. A control data stream is a data stream in which the information information etc. which are specified to the format of DVD disk 1 are included.

[0038]

DVD recorder 10 is provided with the VBI slicing circuit 24.

[0039]

The VBI slicing circuit 24 is a circuit which detects the information information (VBI information) included at the blanking period of the video signal from the video signal into which it was inputted from the video input terminal (Vin).

[0040]

DVD recorder 10 is provided with the following.

Input device 25.

System controller 26.

[0041]

The input devices 25 are input devices such as an infrared ray remote controller for example and are devices with which information inputting for operating DVD recorder 10 by a user is performed. The information inputted from the input device 25 is supplied to the system controller 26.

[0042]

The system controller 26 is control block which comprises a microcomputer etc. which perform setting out and control to each circuit mentioned above.

[0043]

The following is among concrete processings performed by the system controller 26 for example.

[0044]

For example, the system controller 26 reads a control data stream from the buffer circuit 22 and performs access control, display control, etc. to DVD disk 1 based on the control data. At the time of the recording start of data and an end, the system controller 26 is recorded or generates the control information about the recorded data and records the control information on DVD disk 1 as a data stream according to a format. The system controller 26 conducts generation of the header information of MPEG-2 stream and analysis of header information.

[0045]

The system controller 26 generates OSD pictures such as a menu screen for example, supplies the generated OSD picture to the graphic synthetic circuit 19 and displays the OSD picture concerned on a television monitor. The system controller 26 displays the OSD picture which updated the OSD picture suitably and changed it according to the input from the input device 25 on a television monitor. The system controller 26 performs various kinds of control according to the input from the input device 25 or performs predetermined control for which it opts based on the input inputted the OSD picture displayed now and now.

[0046]

The VBI information detected from the video signal into which the system controller 26 was inputted is supplied from the VBI slicing circuit 24. Required information is supplied to MPEG encoder 17 among two or more information shown in this VBI information and the header information of MPEG-2 stream is made to encode. The system controller 26 supplies the VBI information which generated and generated VBI information among the information detected from the header information of MPEG-2 stream based on required information at the time of reproduction to the NTSC/PAL encoder 20. The predetermined blanking position of the video signal to output is made to encode.

[0047]

The operation at the time of record of DVD recorder 10 of the above composition is as follows.

[0048]

At the time of record a video signal and an audio signal are inputted into DVD recorder 10 from the outside. The inputted video signal is changed into the video signal of ITU-R BT.601 format by the NTSC/PAL decoder 15 or the DV decoder 16. The video signal of ITU-R BT.601 format is supplied to MPEG encoder 17 via the switching circuit 21 and is coded by MPEG-2 stream with an audio signal. The control data stream generated by the system controller 26 also stores the buffer circuit 22 temporarily while it stores temporarily MPEG-2 stream coded by MPEG encoder 17. And in DVD recorder 10 the drive device 23 reads MPEG-2 stream and a control data stream from the buffer circuit 22 in an order according to the format of DVD disk 1 and records the read data on DVD disk 1.

[0049]

In DVD recorder 10 the following operations are also performing the image and sound under record so that a user can do EE monitor in real time.

[0050]

The video signal changed into the ITU-R BT.601 format by the NTSC/PAL decoder 15 or the DV decoder 16 is supplied also to the graphic synthetic circuit 19 via the switching circuit 21. The video signal supplied to the graphic synthetic circuit 19 is compounded with an OSD picture when the OSD picture is outputted by the system controller 26 and when the OSD picture is not outputted it is supplied to the NTSC/PAL encoder 20 as it is. The video signal of the ITU-R BT.601 format supplied to the NTSC/PAL encoder 20 is changed into the video signal of NTSC or a PAL format and is changed into an analog signal and is outputted outside. Via the switching circuit 21 after the inputted audio signal is changed into an analog signal it is outputted outside.

[0051]

The operation at the time of reproduction of DVD recorder 10 is as follows.

[0052]

At the time of playback the drive device 23 reads MPEG-2 stream and a control data stream from DVD disk 1 and stores them in the buffer circuit 22. MPEG-2 stream stored in the buffer circuit 22 is read by MPEG decoder 18 and a control

data stream is read by the system controller 26. MPEG-2 read stream is decoded by MPEG decoder 18 by the video signal and audio signal of ITU-R BT.601 format. After the decoded audio signal is changed into an analog signal via the switching circuit 21 it is outputted outside. The video signal of the ITU-R BT.601 decoded format is supplied to the graphic synthetic circuit 19 via the switching circuit 21. The video signal supplied to the graphic synthetic circuit 19 is compounded with an OSD picture when the OSD picture is outputted by the system controller 26 and when the OSD picture is not outputted it is supplied to the NTSC/PAL encoder 20 as it is. After the video signal of the ITU-R BT.601 format supplied to the NTSC/PAL encoder 20 is changed into the video signal of NTSC or a PAL format and is changed into an analog signal it is outputted outside. The system controller 26 performs control various kinds of display control etc. of the reading position of a disk according to the read control data stream.

[0053]

Next the format of the DVD+RW disk which has been the record reproduction target of DVD recorder 10 is explained.

[0054]

Recording positions such as each file at the time of recording contents data on a DVD+RW disk are shown in drawing 2.

[0055]

As shown in drawing 2 the 1st FS area 31 the VRMI area 32 the VMG area 33 the VTS area 34 and the 2nd F0S area 35 are formed in the record section 30 of a DVD+RW disk from the inner circumference side.

[0056]

The UDF (universal disc format) file system 41 is recorded on the 1st FS area 31 and the 2nd FS area 35. The UDF file system 41 is the information for managing all the files currently recorded in the record section concerned and information including the starting position of each file and size a file name a recording date etc. is described. The 1st FS area 31 is formed in the most inner circumference of a disk and the 2nd FS area 35 is formed in the periphery side.

[0057]

The VRMI area 32 (32-132-2) is formed in the periphery [ of the 1st FS area 31 ]and inner circumference side (32-1) (32-2) of the 2nd FS area 35. The VRMI.BUP file 54 which are the VRMI.IFO file 42 uniquely defined by the DVD+RW disk which is not the file specified by the DVD-VIDEO standardand its backup file is recorded on the VRMI area 32. The management information about a title etc. is recorded on the VRMI.IFO file 42 and the VRMI.BUP file 54. Specificallythe position of the entity data of each title currently recorded on the VTS area 34the recording date of each titlethe title name of a titledisknameetc. are described.

[0058]

The VMG area 33 is formed in the periphery side of the VRMI area 32-1. VMG (Video Manager) specified by the DVD-VIDEO standard is recorded on the VMG area 33. The recording address of each VTS with which VMG is recorded on the VTS area 34The menu data (MPEG-2 data stream and control data) for making the menu screen which is a user interface picture for reproducing informationincluding a VTS number etc.and a title display and control is recorded.

[0059]

SpecificallyVMG comprises the VMGI.IFO file 43the VMGM\_VOBS file 44and the VMGI.BUP file 45. The entity data (MPEG data stream etc.) of menu data is described by the VMGM\_VOBS file 44. While the VMGI.IFO file 43 reproduces menu datathe management data for controlling a menu screen is described. The VMGI.BUP file 45 is a backup file of the VMGI.IFO file 43.

[0060]

The VTS area 34 is formed in the periphery side of the VMG area 33. 1-3 VTS(s) (Video TitleSet) specified by the DVD-VIDEO standard are recorded on the VTS area 32. In the case of a DVD+RW diskVTS is a file set which comprises a management data file and an entity data file. In a DVD+RW disk1-3 VTS(s) are formed of the video attribute of each title in the VTS area 34. For exampleif the attribute of video is the same in all the titlesone VTS is formedand VTS will be

three pieces when the title which consists of three kinds of different video attributes is intermingled on one disk.

[0061]

Each VTS comprises three files of VTSl#n.IFO file 51-n VTSTT\_VOBS#n file 52-n and VTSl#n.BUP53-nas shown in drawing 3 and drawing 4. "n" is the integers from 1 to 3 which showed the VTS number here. VTSl#n.IFO file 51-n is the file in which the management information of the VTS was contained. VTSl#n.BUP file 53-n is a backup file of VTSl#n.IFO file 51-n. VTSTT\_VOBS#n file 52-n is the file in which the entity data of VTSi.e.MPEG-2 data streamwas contained.

[0062]

In a DVD+RW diskas shown in drawing 3 and drawing 4each file of the VTSl#1.IFO file 51-1 - the VTSl#3.IFO file 51-3 is recorded on the head part of the VTS area 34. As for VTSTT\_VOBS#1 filerecord is started from the address of the predetermined immobilization in the VTS area 34.

[0063]

Behind the VTS area 34the VRMI.BUP file 54 which is a backup file of the VRMI.IFO file 42 is recorded.

[0064]

Nextprocessing of DVD recorder 10 after being equipped with the DVD+RW disk in the above formats until it is discharged is explained with reference to drawing 5 - drawing 7.

[0065]

Drawing 5 (A) is a figure showing the recorded information on DVD+RW before the record and edit to contents data are carried outafter being equipped with a DVD+RW disk. Drawing 5 (B) is a figure showing the stored information of the internal memory which the system controller 26 before the record and edit to contents data are carried out hasafter being equipped with a DVD+RW disk. Drawing 6 (A) is a figure showing the recorded information on DVD+RW after the record and edit to contents data were carried out. Drawing 6 (B) is a figure showing the stored information of the internal memory which the system

controller 26 after the record and edit to contents data were carried out has.  
Drawing 7 (A) is a figure showing the recorded information on DVD+RW at the time of disk discharge. Drawing 7 (B) is a figure showing the stored information of the internal memory which the system controller 26 at the time of disk discharge has.

[0066]

First if equipped with a DVD+RW disk the system controller 26 reads each management data about the contents data currently recorded on the DVD+RW disk concerned as shown in drawing 5 (A) and stores it in an internal memory. As management data as shown in drawing 5 (B) the system controller 26 specifically the VRMI.IFO file 42, the VMGI.IFO file 43 and the VTSS.IFO file group 51 (the VTSS#1.IFO file 51-1 - the VTSS#3.IFO file 51-3) are read and it stores in an internal memory.

[0067]

It performs reproduction control of a DVD+RW disk based on the read management data until the system controller 26 has renewal of management data and the record and updating of contents data.

[0068]

Then if renewal of management data and the record and updating of contents data occur the system controller 26 that is if processing of the additional recording of a new title, deletion of a recorded title, change of a title name etc. occurs as shown in drawing 6 (B) each management data (the VRMI.IFO file 42, the VMGI.IFO file 43 and the VTSS.IFO file group 51) stored in an internal memory to compensate for the processing is updated.

[0069]

Under the present circumstances as shown in drawing 6 (A) the renewal of each management data (the VRMI.IFO file 42, the VMGI.IFO file 43 and the VTSS.IFO file group 51) on a disk does not perform the system controller 26. The backup file (the VMGI.BUP file 45, the VTSS.BUP file group 53 and the VRMI.BUP file 54) of management data is not recorded. Renewal of the VMGM\_VOBS file 44 on the

disk with which the entity data of the menu screen is recorded is not performed either.

[0070]

But when not updating the VMGM\_VOBS file 44 on a disk it will be in the state where compatibility with the VMGL.IFO file 43 currently held at the internal memory is not maintained. Therefore the system controller 26 controls henceforth not to reproduce the VMGM\_VOBS file 44. That is even if it is a case where a user performs display control of a title menu and a case so that a title menu may be automatically displayed with the end of title reproduction henceforth for example it controls not to display a menu screen. For example it is in the VMGL.IFO file 43 of an internal memory. The contents of the descriptor "Entry PGC for Title Menu of VMGM\_PGC#1" it rewrites with LinkSins {RSM} which is a command of the meaning of returning to the original title reproduction or rewrites to Exit etc. which are the commands of the meaning of suspending reproduction immediately.

[0071]

When not reproducing the VMGM\_VOBS file 44 in this way it becomes impossible for a user to perform selection reproduction of the title using menu manipulation. Therefore the system controller 26 displays by creating a reproduction menu screen by an OSD picture separately with reference to the VRMI.IFO file 42 grade stored in an internal memory.

[0072]

Then when the system controller 26 performs emission control of a disk as shown in drawing 7 (A) just before the discharge First write in VMGM\_VOBS 44 which is menu data and it continues. The contents of each management data stored in the internal memory are written in the VRMI.IFO file 42 on a disk the VMGL.IFO file 43 the VTSS.IFO file group 51 the VTSS.BUP file 53 and the VRMI.BUP file 54. That correction is also made when it rewrites so that the menu indication of the descriptor of a VMGL.IFO file may not be carried out in this case. The system controller 26 writes the VMGM\_VOBS file 44 corresponding to the menu data

which generated menu data and was newly generated in a disk.

[0073]

And after the writing of these files is completed as shown in drawing 7 (B) the contents of the internal memory are eliminated and a disk is discharged.

[0074]

As mentioned above with DVD recorder 10 at the time of discharge of a DVD+RW disk the menu data reflecting the contents of the title recorded now is generated and the menu data and management data which were generated are recorded on a DVD+RW disk.

for this reason in DVD recorder 10 since record of menu data and management data is not performed at the time of the end of record of contents data or the end of updating it cannot respond to the operational input from a user immediately -- like -- redundant operating time is reducible. Therefore in DVD recorder 10 when performing continuous recording of contents data the following record can be performed immediately.

[0075]

Although this embodiment explained the case where contents recorded to DVD+RW it is also possible to apply this invention to DVD-RW. Although it is considered as the time of disk discharge it may be made to perform the writing of management data to a disk at the time of the write-in instructions by a user etc. at the time of power OFF or sleep for example.

[0076]

Although it supposes that not only menu data but all the management data is recorded at the time of disk discharge in an above embodiment it may be made to write some management data (for example the VTS.IFO file group 51 and VRMI.IFO file 42 grade) in a disk at the time of the end of record of a title.

[0077]

[Effect of the Invention]

In the recording and reproducing device and method concerning this invention when there are directions from the time of an operation stop or a user at

the time of discharge of the above-mentioned recording medium the menu data reflecting the contents of the contents data currently recorded on the present recording medium is generated and the menu data and management data which were generated are recorded on the above-mentioned recording medium.

[0078]

for this reason in the recording and reproducing device and method concerning this invention since record of menu data and management data is not performed at the time of the end of record of contents data or the end of updating it cannot respond to the operational input from a user immediately -- like -- redundant operating time is reducible. Therefore in this invention when performing continuous recording of contents data the following record can be performed immediately.

[Brief Description of the Drawings]

[Drawing 1] It is a block line block diagram of the DVD recorder of an embodiment of the invention.

[Drawing 2] It is a figure for explaining the format of a DVD+RW disk.

[Drawing 3] It is a figure for explaining the format of the VTS area of a DVD+RW disk.

[Drawing 4] It is a figure for explaining the write-in starting position of the entity data in a DVD+RW disk.

[Drawing 5] After being equipped with a disk it is a figure showing the file currently recorded on the DVD+RW disk before the record and edit to contents data are carried out and the file in an internal memory.

[Drawing 6] It is a figure showing the file currently recorded on the DVD+RW disk after the record and edit to contents data were carried out and the file in an internal memory.

[Drawing 7] It is a figure showing the file currently recorded on the DVD+RW disk at the time of disk discharge and the file in an internal memory.

[Description of Notations]

1 A DVD disk 10 DVD recorders 15 NTSC/PAL decoder 16 DV decoder 17 MPEG

encoders18 MPEG decoders19 A graphic synthetic circuit20 NTSC/PAL  
encoder21 switching circuits22 buffer circuitsand 23 A drive circuit24 VBI slicing  
circuitand 25 An input device and 26 System controller

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## DESCRIPTION OF DRAWINGS

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